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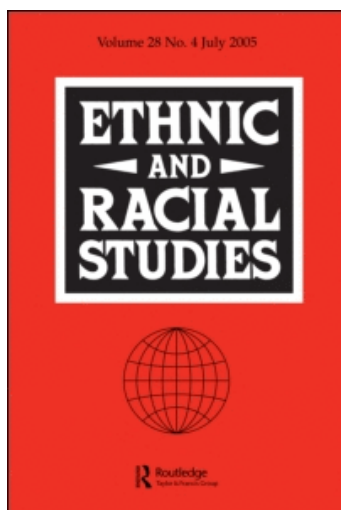
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# Educational performance of native and immigrant children from various countries of origin

Mark Levels and Jaap Dronkers

## Abstract

Mostly due to the lack of suitable data, cross-national research on the integration of migrant pupils is still scarce. We aim to fill this gap by addressing the question of the extent to which native and first- and second-generation migrants from various regions of origin, living in thirteen different countries of destination, differ in their scholastic ability. Using the PISA 2003 data, we focus primarily on the impact of origin and destination effects on the scholastic achievement of migrants.

The results indicate that family characteristics and origin and destination effects can offer a significant contribution to the explanation of difference in scholastic knowledge between natives and first- and second-generation migrants. However, certain primary origin and destination effects, as well as interactions between these and family characteristics, remain significant and substantive after controlling for family characteristics, suggesting serious integration problems in the case of migrants from a few regions of origin in some European countries of destination.

**Keywords:** Educational achievement; immigrants; cross-national comparison; countries of origin; countries of destination.

## Introduction

During the twentieth century, the character of international migration changed spectacularly. Not only did the phenomenon become more global in scale, but, due to 'fundamental transformations in economic, social and political structures' in the post-Cold War era, European nations turned from immigrant-sending countries into immigrant-receiving countries, attracting immigrants from less developed Third World countries (Castles and Miller 1998). These developments have had considerable consequences for both outflow and inflow countries.

In the new immigrant-receiving countries, the influx of large numbers of immigrants has had vast consequences for population composition, raising questions as to the integration of newcomers into society.

To some extent immigrants' economic integration in the countries of destination can be explained by individual characteristics such as gender, language skills, human capital, age at the time of migration, work experience and marital status (Rumberger and Larson 1998; Kao and Thompson 2003). After Portes' (1999) call for more cross-national tests of integration hypotheses, a number of studies using cross-national analyses of the integration of immigrants were published (for example, Reitz 1998; Model, Fischer and Silberman 1999; Reitz *et al.* 1999; Kogan 2003; Lewin-Epstein *et al.* 2003). These studies are insightful, but share a design that is limited to a small number of host countries, such that the authors are unable sufficiently to test explanations on observed cross-national differences. Recently, a number of scholars have acknowledged the need for rigorous tests of hypotheses involving macro-level characteristics and have called for a design that uses data on immigrants from a multitude of origin countries as well as a multitude of host countries. Consequently, researchers found that the economic integration of migrants also depended on macro-level circumstances, such as immigrant group characteristics and the receiving societal context (Tubergen 2004; Tubergen, Maas and Flap 2004; Tubergen and Kalmijn 2005).

In this contribution, we focus on immigrant pupils' education. Education has long been regarded as the most important means of social advancement for immigrant families and thus a measure of the level of integration into the countries of destination. In the absence of other resources, the education system provides an opportunity for the social advancement of the next generation. Success in the education system allows the children of migrants to obtain higher paying and higher status jobs with a concomitant rise in the family's social standing. Of course, education is not the only means of social advancement; but in post-industrial societies the educational system is the most promising avenue.

To explain immigrants' educational performance, social scientists have traditionally focused on individual characteristics and school characteristics. As the literature shows, individual-level characteristics, such as socio-economic background, gender or familial cultural capital, all greatly affect immigrants' educational performance. Also, school size and socio-economic and ethnic school segregation are known to affect immigrant students' performance. However, recent cross-national studies on the educational performance of immigrants demonstrate that such micro-level and meso-level determinants do not tell the whole story. For example, Marks (2005) analyses the educational performance of first- and second-generation migrants in

a large number of countries. He establishes that, in most countries of destination, socio-economic, social-cultural and school characteristics largely explain the differences in scholastic achievement between native and immigrant pupils. However, after controlling for variables at the individual level and the school level, the differences between migrants and natives still vary substantially between countries. These cross-national differences are unlikely to be explained by socio-economic or social-cultural compositional differences in the student populations, since most relevant individual-level characteristics to do with socio-economic and social-cultural background have been incorporated into the models. Given the aforementioned findings on the influence of macro-level circumstances on almost all other aspects of immigrant integration, we expect such characteristics to affect immigrant children's schooling as well.

We argue that fully to understand immigrants' scholastic achievement, macro-level characteristics of the countries of destination must also be taken into account. Cross-national differences in immigrant students' scholastic performance might, for example, be partly explained by different educational systems, by different policy measures concerning the reduction of socio-economic inequalities or by different immigration laws. For example, countries can adopt an immigration law that is more or less restrictive. Some western countries grant permission to settle only to the most qualified immigrants (Borjas 2001). Such laws greatly influence the socio-economic composition of immigrant populations: the higher the demands of an immigration law with respect to immigrants' socio-economic status, the higher the proportion of educated and better-skilled immigrants on average. Another example is that left-wing political parties usually hold more tolerant views towards cultural pluriformity, and hence impose less stringent demands on the cultural assimilation of immigrants. This tolerance is mirrored in the policies of left-wing governments. For example, laws that encourage positive action are meant to stimulate the economic integration of minorities within the higher socio-economic strata of society. However, these policies may prove to be counterproductive, as they may reduce the incentive to perform well at school. Tubergen and Kalmijn (2005) found that the longer left-wing parties played a dominant role in governing a country, the fewer immigrants in the country gained proficiency in the national language.

Another explanation of such cross-national differences may be found in the diversity of the origin composition of the migrant population in these different countries. For example, origin groups hold different cultural views on the evaluation of success and performance. Kao and Thompson (2003) go back to an argument of Max Weber in *The Protestant Ethic*, in which religious differences play

an important role when explaining variation in the scholastic achievement of different immigrant groups. The higher valuation of performance among American Jews, Greeks and Protestants has been linked to the higher level of upward mobility of these minority groups in comparison to Americans of African, Southern-Italian and French-Canadian descent (Rosen 1959). Also the level of discrimination against immigrants from various origins may be different, as well as their reaction to discrimination. Kao and Thompson (2003) presented evidence in support of the assumption that the way in which immigrant pupils deal with expectations of future discrimination also depends on their origin. In the United States, African-American pupils more often refrain from pursuing an academic career when they expect to be discriminated against (Ogbu 1991). In comparison, South-Asian American pupils appear to experience discrimination as an incentive to perform better at school (Sue and Okazaki 1990). These and other cultural differences can produce different educational outcomes between immigrant pupils, originating from different regions.

In this contribution, we will examine the scholastic performance of first- and second-generation migrant pupils from various countries of origin, living in various western countries of destination, controlling for a number of relevant individual and contextual characteristics. We will address two questions. First, we aim to establish performance differences between first-generation and second-generation immigrants and natives, and determine how much of this effect remains when family characteristics, like occupational status and educational level, are controlled for. Second, we examine the extent to which countries of origin and destination can explain the residual differences in the levels of educational performance between native pupils and their first- and second-generation migrant counterparts.

### **Data and variables**

Because migration from countries of origin to countries of destination is selective, the effects of country of origin and country of destination need to be analysed simultaneously. Such analyses require relatively large data sets with sufficient information on immigrants' countries of origin and the social and economic characteristics of the immigrant and native population. Data sets that meet such requirements were not available until very recently. In this article, we make use of data from the 2003 wave of the Project for International Student Assessment (PISA) (OECD 2004). This large cross-national data set on the educational performance of 15-year-old pupils contains specific information about immigrants' countries of origin, for a number of destination countries.

The PISA project is initiated and coordinated by the OECD, and consists of a triennial cross-sectional survey among 15-year-old pupils from OECD countries and a certain number of partner countries. From these countries, we selected the highly developed countries in Europe, Northern America and the Pacific Rim. For the first time, the 2003 PISA questionnaire also included questions on the countries of birth of both the interviewed pupils and their parents. In addition, a question on the language commonly used at home was included. However, due to specific consequences of the methods of international data gathering employed, the results concerning countries of birth varied between test countries. PISA offered participating test countries the possibility of determining a set of answers in advance, allowing countries to include in the data set their most important groups of immigrants. German students, for example, could indicate if they were born in Russia, the former Yugoslavia, Greece, Italy, Poland or Turkey, whereas students in Scotland could tick China, India or Middle-Eastern, African, Caribbean and European countries as countries of birth.

Since an understanding of how these variables are used to identify respondents' *regions of origin* is essential when interpreting our test results and since the decision to construct such variables had considerable consequences for the constitution of our data set, we will at this point elaborate further on the construction of each of these variables. We use information on the countries of birth of respondents and their parents to establish a single region of origin, by recoding all countries of birth mentioned in the data set into regions, based upon a slightly adjusted version of the United Nations Statistical Division's composition of macro geographical regions (shown in Appendix I, available on request from Jaap Dronkers). However, a number of coding problems had to be addressed in order to establish a region of origin for as many respondents as possible. In all test countries, the category 'other countries' was included as a possible answer to the country of birth of both respondents and their parents. In order to include as many as possible of these 'other countries' cases, we used the variable 'language spoken at home', which was also available in some detail, as a guide. Using Grimes (2000), we determined in which country each given language is considered a national language. Then we linked each language with a specific region of origin. If a language was considered a national language in only one region, we used that as an indicator of the region of origin of those respondents or parents who were born in 'other countries'. Consequently, globally used languages such as English, French or Spanish could not be used for this procedure. Sometimes, the variables on the countries of birth contained missing or otherwise indefinable values. In order to incorporate these cases where possible we relied only on available

information, including the language spoken at home. For example, if only one country of birth could be validly identified (e.g. the respondent was born in a Western-Asian country), and the other two birth countries were unknown, we decided to use the valid country of birth to establish the region of origin (e.g. Western Asia). If two out of three countries of birth could be validly identified, and both of these countries were part of the same region, we established this region to be the origin region. If the two countries of birth belonged to different regions, we used the language spoken at home as described above. Where the countries of birth of respondents and their parents were all known, they were not always part of the same region. For example, a respondent could be born in Northern Europe, his or her mother in Northern Africa and his or her father in Western Europe. In such cases, we again made use of the language spoken at home. If one of the regions of birth matched the region of origin of the language commonly spoken at home, we chose this region as the region of origin. If the language did not lead to a clear decision, we took the region of birth of the mother as the region of origin, given that motherhood is a fact, whereas fatherhood is an opinion. Ultimately, respondents who could not be allocated to an unambiguous region of origin were classified accordingly.

It should be noted at this point that not all countries allowed for an elaborate specification, some distinguishing only between natives and non-natives. Others included only countries that were a part of the same region as the test country or allowed only for possible answers that were insufficient in the context of our research questions. The decision to ask for the countries of birth of pupils and parents was rejected by important countries (including England, France and Sweden) despite their own major problems with, and different approaches to, the absorption of immigrants into their society. We subsequently excluded these countries from our analyses. Some of the traditional immigrant-receiving countries like Canada and the USA had to be excluded from our analyses for the same reason. Thirteen countries were fit for this analysis: Australia, Austria, Belgium, Denmark, Germany, Greece, Ireland, Latvia, Liechtenstein, Luxembourg, New Zealand, Switzerland and Scotland. Table 1 shows the distribution of respondents within each country of destination, differentiated respectively by the respondent's status as native or first- or second-generation migrant and the region of origin.

### *Other independent variables*

We use a number of variables to account for the status of immigrant students. We constructed a new variable that allows us to distinguish between natives and first- and second-generation immigrants in a



Table 1. Absolute and relative<sup>1</sup> frequencies of respondents by migrant generation status and region of origin, per test country (N=67,865)

	Natives		Migrants		Region of origin																	Origin not known	Just one parent born in test-country	Foreign language spoken at home																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Source: PISA (2003)

Notes

<sup>1</sup> Relative frequencies are in italics

NEU = Northern Europe; WEU = Western Europe; EEU = Eastern Europe; SEU = Southern Europe; NAM = North America; SAM = South and Central America; NAF = Northern Africa; SAF = Southern and Central Africa; AUS = Australia and New Zealand; OCE = Oceania; WAS = Western Asia; EAS = Eastern Asia; SAS = Southern Asia; SEAS = Southeast Asia.

realistic way. We based the construction of this variable on both the region of parental origin and the country of birth of the student. If a pupil was born in the test country, and his/her family originated from the test country, we would consider the pupil to be native. Pupils who were born abroad but one of whose parents originated from the test country were coded '*one of the parents born in test-land*'. This was a way of controlling for the effects of geographical mobility among the higher strata within highly developed countries, due to international marriages and careers. Migrants include all those pupils with at least one parent born outside the test country. If a migrant pupil was born in the test country, he or she was regarded as a *second-generation migrant*; migrant pupils who were born abroad were considered *first-generation migrants*. This distinction between first- and second-generation migrants deviates from that of Portes and Rumbaut (2001), but we believe that this distinction is cross-nationally clearer and is less likely to underestimate the importance of pre-school socialization. If a respondent's country of birth was not specified, the immigrant status was coded as '*undefined*'. In addition, we also controlled for the effect of *speaking a foreign language at home*, by using a dichotomous variable to evaluate all pupils who used a language at home that was not an official language of the test country.

Several relevant background characteristics affect pupils' scholastic abilities. From analyses of the 2003 PISA data by the OECD, it becomes obvious that the higher the education of one's parents, the better one performs in mathematics (OECD 2004). In order to take this into account, we controlled for the *level of education of both father and mother*; these levels were measured using the ISCED scale (OECD 1999). Furthermore, parental occupational status is also known to have a strong association with student performance (OECD 2004); we controlled for the effects of *occupational status of both individual parents*, measured on an ordinal scale that distinguishes respectively between low- and high-skilled blue-collar and low- and high-skilled white-collar workers. As the OECD states in its first analyses of the PISA data, the effect of family structure is considerable. For example, pupils who come from single-parent families on average perform worst on the mathematical proficiency scales (OECD 2004). We therefore controlled for the effect of coming from a *nuclear family* by using a dummy variable which distinguished between pupils from a nuclear family and pupils with other family situations. We also controlled for the influence of the presence of classical cultural resources (e.g. the presence of literature, poetry and works of art) through the use of the *index of cultural possessions of the family*. By using the *index of home educational resources* we controlled for the effect of coming from a family in which parents provide an atmosphere that is stimulating to pupils. The *index of home possessions* was used to control for the effects

of the presence of material means, e.g. computer, home internet access, car, mobile phone, dishwasher and television. All three indices were developed by PISA; they are constructed by applying weighed likelihood estimates, standardized to have a mean of 0 and a standard deviation of 1 at the international level. Finally, we used a dichotomous variable to distinguish between *males* and *females*. Table 2 provides an overview of the mean scores of some of our independent and intermediate variables, again differentiated according to our constructed classification of migrants.

### *Mathematical literacy*

In order to establish respondents' mathematical ability, the PISA questionnaire contained open as well as limited response questions on a wide variety of practical situations. All problems required some degree of mathematical insight in order to be solved. Together, they covered a broad range of mathematical knowledge. All students were presented with tests that contained four-item clusters. Using item response modelling, five subsets of plausible values were computed. Each subset contained a number of five plausible values that represented a set of values for each respondent at random from an estimated ability distribution of students with similar item response patterns and backgrounds. These values are considered to provide good estimates of student population parameters (OECD 2004). The plausible values were transformed into a scale with an OECD mean of 500 and a standard deviation of 100. As our dependent variable, we used the average of these five plausible values in general mathematics.

In Table 3, we show the variability of average scores on the mathematical performance scales per test country, using our migrant classification to differentiate results. When looking at the overall mean scores on the mathematical ability scale in Table 3, it becomes obvious that mathematical ability varies between natives and migrants: natives perform better than second-generation migrants, who in turn perform slightly better than first-generation migrants. Furthermore, the region of origin seems to have a noticeable effect on mathematical skills. For example, migrants from Northern Europe score an average of 538.23 on the mathematical ability scale, whereas migrants from Western Europe score 493.50. In terms of our research questions, these descriptive statistics provide a good indication that being a migrant does affect one's chances of being successful in highly developed countries and that it does matter from which region one's family originates.

Although our approach leaves us with a relatively small selection of migrant groups large enough in terms of respondent numbers to make analyses meaningful ( $n > 25$ ), we do believe the results in Table 3

Table 2. Mean scores and standard deviations<sup>1</sup> on some independent and intermediate variables, by migrant generation status and by region of origin (*N* = 67,865)

	Natives		Migrant generation status		Region of origin															Just one parent born in test-country	Foreign language spoken at home
	Yes	No	First generation	Second generation	NEU	WEU	EEU	SEU	NAM	SAM	NAF	SAF	AUS	OCE	WAS	EAS	SAS	SEAS			
Father educational level	3.99	3.61	3.76	3.41	4.43	4.26	4.49	2.97	4.50	3.91	2.56	4.60	3.95	3.05	2.46	4.06	4.76	4.44	4.19	3.45	
Father occupational status	1.52	1.96	1.93	1.98	1.59	1.74	1.69	1.88	1.38	1.64	2.32	1.70	1.56	2.04	1.89	1.95	1.65	1.76	1.59	2.03	
Mother educational level	2.84	2.54	2.57	2.50	3.14	2.99	2.46	2.16	2.78	2.80	2.15	3.02	2.74	2.39	2.09	3.22	3.18	2.82	2.93	2.55	
Mother occupational status	1.16	1.17	1.16	1.19	1.11	1.14	1.14	1.01	1.00	1.11	1.19	1.18	1.21	1.23	1.11	1.01	1.18	1.22	1.16	1.16	
Home educational resources	3.92	3.42	3.54	3.26	4.37	3.98	4.66	2.70	4.11	4.08	2.35	4.15	4.01	3.35	1.89	3.94	4.46	4.08	4.11	3.16	
Family cultural possessions	1.48	1.96	1.93	1.98	1.51	1.78	1.53	1.79	1.49	1.78	2.19	1.82	1.60	1.81	1.75	1.87	1.90	1.87	1.57	2.04	
Index of family possessions	2.99	2.50	2.48	2.52	3.23	2.93	2.94	1.98	3.22	2.58	1.78	3.00	3.10	2.78	1.76	3.05	2.93	2.80	3.08	2.74	
Nuclear family	1.10	1.26	1.27	1.25	1.01	1.13	1.13	1.17	.94	1.12	1.19	1.23	1.11	1.25	1.12	1.12	1.22	1.16	1.08	1.27	
	.05	−.05	−.10	.03	.09	.10	−.11	−.13	.08	−.30	−.09	−.10	−.06	−.33	−.15	.25	.20	.08	.08	−.07	
	.95	1.02	1.06	.95	.93	.99	1.05	1.03	.81	1.34	1.07	1.07	1.07	1.07	1.03	.85	.88	.92	.93	1.03	
	−.09	−.24	−.25	−.23	.02	−.11	.27	−.42	.10	−.51	−.54	−.32	−.29	−.49	−.47	−.18	−.26	−.28	−.02	−.35	
	1.00	.97	.96	.97	1.04	1.02	.97	.88	1.03	.88	.90	.94	.99	.79	.84	.95	1.00	.97	1.01	.92	
	.09	−.14	−.18	−.09	.34	.14	−.23	−.37	.30	−.54	−.41	−.15	.00	−.56	−.38	.19	.13	.02	.15	−.22	
	.92	.93	.98	.87	.96	.98	.90	.83	.82	1.01	.93	1.07	.98	.77	.83	.83	.89	.83	.94	.92	
	.70	.72	.70	.74	.66	.62	.68	.77	.76	.27	.77	.63	.58	.75	.82	.69	.83	.72	.64	.76	
	.46	.45	.46	.44	.47	.49	.47	.42	.44	.45	.42	.49	.49	.44	.39	.46	.37	.45	.48	.43	

Source: PISA (2003)

Note

<sup>1</sup> Standard deviations are in italics.

Table 3. Mean scores and standard deviations<sup>1</sup> on mathematical ability, by migrant generation status and region of origin, per test country (N = 67,865)

	Natives		Migrant generation status		Region of origin														Just one parent born in test-country	Foreign language spoken at home
	Yes	No	First-generation	Second-generation	NEU	WEU	EEU	SEU	NAM	SAM	NAF	SAF	AUS	OCE	WAS	EAS	SAS	SEAS		
All	517.75	478.94	476.33	482.32	538.23	493.50	474.62	447.19	518.21	431.10	451.33	489.68	516.19	443.02	432.04	563.77	534.74	544.10	474.30	
Australia	91.76	98.55	101.26	94.83	89.87	101.27	91.00	84.15	84.05	81.97	88.65	102.82	93.67	83.74	88.01	97.78	96.98	91.22	99.48	
Austria	522.96	529.99	531.60	528.45	535.95	522.60	—	490.28	—	—	—	—	511.75	—	468.82	567.92	572.83	543.45	516.75	
Austria	91.90	96.04	97.71	94.45	92.40	96.53	—	80.29	—	—	—	—	96.66	—	91.07	97.74	91.86	91.54	98.849	
Austria	520.92	458.82	456.94	462.71	—	493.86	503.48	454.92	—	—	—	—	—	—	430.04	—	—	—	461.18	
Belgium	85.58	84.65	86.50	80.77	—	93.64	82.02	79.94	—	—	—	—	—	—	76.01	—	—	—	87.31	
Belgium	547.83	459.18	463.36	454.35	573.23	472.84	481.81	—	—	—	450.83	444.18	—	—	424.43	—	—	—	465.53	
Denmark	96.29	102.30	105.46	98.42	112.01	107.81	109.65	—	—	—	88.73	101.81	—	—	84.81	—	448.27	—	100.85	
Denmark	518.60	433.31	447.99	427.10	—	—	—	439.66	—	—	—	—	—	—	421.84	—	66.01	—	470.59	
Germany	85.62	72.75	69.92	73.48	—	—	—	—	—	—	—	—	—	—	70.58	—	—	—	86.65	
Germany	528.21	443.90	453.46	434.33	—	469.14	472.85	440.18	—	—	—	—	—	—	407.87	—	—	—	465.20	
Greece	86.57	95.67	97.46	93.04	—	104.95	92.87	87.85	—	—	—	—	—	—	83.36	—	—	—	92.88	
Greece	445.67	402.31	401.19	410.73	—	—	402.80	401.75	—	—	—	—	—	—	—	—	—	—	443.23	
Ireland	88.79	84.93	83.55	95.17	—	—	85.75	84.95	—	—	—	—	—	—	—	—	—	—	89.95	
Ireland	504.95	503.65	508.15	478.98	498.91	501.99	535.95	526.61	518.21	383.54	527.68	497.13	567.80	—	472.07	475.30	532.90	522.39	89.94	
Latvia	81.10	89.08	90.05	80.32	89.25	122.77	92.22	99.05	84.05	35.64	—	91.16	32.88	—	54.56	99.75	93.63	22.29	79.96	
Latvia	486.50	488.02	505.61	484.10	—	—	487.12	—	—	—	—	—	—	—	—	—	—	—	484.28	
Liechtenstein	83.25	82.22	86.91	80.74	—	—	82.48	—	—	—	—	—	—	—	—	—	—	—	81.94	
Liechtenstein	548.54	483.76	472.34	499.15	—	529.82	—	452.24	—	—	—	—	—	—	494.29	—	—	—	521.68	
Luxembourg	87.94	113.98	126.57	95.00	—	130.45	—	91.68	—	—	—	—	—	—	121.52	—	—	—	93.45	
Luxembourg	507.18	460.64	453.07	470.05	—	86.72	—	444.31	—	—	—	—	—	—	—	—	—	—	496.70	
New Zealand	83.70	86.23	89.64	80.90	—	—	—	80.83	—	—	—	—	—	—	—	—	—	—	83.08	
New Zealand	529.49	515.13	529.56	483.98	550.64	—	—	—	—	—	—	547.27	531.50	443.02	—	559.98	536.91	554.94	93.17	
Switzerland	92.82	98.97	95.10	100.19	80.67	—	—	454.57	—	432.97	—	76.81	80.76	83.74	—	101.16	89.75	94.11	540.80	
Switzerland	535.46	460.94	450.08	476.53	—	523.95	—	82.18	—	—	—	—	—	—	436.22	—	—	—	92.23	
Switzerland	84.68	88.21	87.51	86.92	562.24	96.65	—	82.18	—	—	—	—	—	—	94.57	—	—	—	516.69	
Scotland	519.73	554.36	558.46	547.04	—	—	—	—	—	—	—	511.66	—	—	576.11	555.59	500.78	628.47	84.88	
Scotland	79.34	81.39	74.91	91.86	79.37	—	—	—	—	—	—	83.88	—	—	106.98	46.26	84.18	—	86.24	

Source: PISA (2003)

Note

<sup>1</sup> Standard deviations are in italics.

further indicate that origin and destination effects do occur simultaneously. For example, when looking at the average scores on the mathematical performance scales of migrants in Ireland, we must establish that only the group of migrants originating from Northern Europe ( $n=154$ ) is large enough in number to allow a valid comparison. However, we can compare the mean score of migrants from Northern Europe in Ireland and New Zealand ( $n=146$ ); these mean scores being 498.91 and 550.64 respectively. We would argue that this variability provides a clear indication that, given the region of origin, the chances of being successful in society do depend on which country one immigrates to.

### **Regression analyses**

The conclusions drawn in the previous paragraph can only be preliminary, since a straightforward comparison of the means of different population subgroups can be misleading. In order to make an unbiased comparison, we have to take into account relevant background characteristics that might explain the differences occurring. In order to analyse our data more thoroughly, we used OLS linear regression to test five different models; in each model the average score on the mathematical performance scales is used as the dependent variable. The results are shown in Tables 4 and 5. Please note that in all the models presented, dummies for the countries of destination were added as independent variables, using Australia as reference, although not presented (but shown in Appendix II, available on request from Jaap Dronkers).

In model A, in Table 4, dummies for generation status effects, dummies for the region of origin and two other migrant characteristics (one parent from test country; foreign language at home) are included, using natives as a reference. In this model, first-generation effects are significant and substantial, but second-generation effects are insignificant. As might be expected, the use of a foreign tongue affects one's scholastic abilities negatively. In addition, coming from a multicultural family also has a negative effect on one's mathematical abilities. Furthermore, some significant effects of the region of origin also occur. For example, with reference to native pupils, migrants from Northern European countries perform better on the mathematical scales and migrants from Western Asia perform worse.

With model B, in Table 4, we aim to test to what extent socioeconomic background characteristics explain the variation in origin effects. We take into account the education levels of both parents, the occupational status of both parents, the indices of family cultural possessions, home educational resources and home possessions as well as a dichotomous variable indicating if one is part of a nuclear family

**Table 4.** OLS regression of respondents' mathematical performance on migration and background characteristics, corrected for origin and destination effects (unstandardized effects)

	MODEL A Generation + origins + migration history	MODEL B A + background characteristics	MODEL C B + interactions
Intercept	527.1**	424.9**	424.14**
Natives (ref)	.00	.00	.00
First-generation	-25.6**	-.5	2.16
Second-generation	-12.86	7.2	23.21**
Undefined	-30.3**	-17.4**	-16.69**
Test country (ref.)	.00	.00	.00
Northern Europe	35.7**	2.9	-1.59
Western Europe	-15.3	-32.0**	-53.44**
Eastern Europe	4.0	13.8	-9.54
Southern Europe	-38.5**	-35.1**	-17.37*
Northern America	38.4	-3.2	-1.54
Southern/Central America	-68.3**	-66.1**	-59.20**
Northern Africa	-56.7**	47.1**	-47.40**
Southern/Central Africa	-11.1	-27.1**	2.00
Australia and New Zealand	11.4	-1.3	-.66
Micronesia. Melanesia and Polynesia	-65.7**	-58.2**	-33.69*
Western Asia	-65.4**	-52.6**	-56.41**
Eastern Asia	68.5**	40.8**	3.88
Southern Asia	37.3**	4.8	9.96
Southeast Asia	43.0**	27.2*	37.17*
Origin unknown	-13.3**	-5.9*	-6.15**
Just one parent from test-country	-2.7*	-3.7**	-1.41
Foreign language spoken at home	-12.6**	-6.9**	-1.13
Language Missing	-53.1**	-37.2**	-36.51**
Nuclear family		12.1**	9.61**
Home cultural possessions		-4.3**	-5.33**
Home educational resources		2.8**	2.83**
Index of home possessions		27.6**	26.47**
Father educational level		2.7**	3.69**
Father educational level Missing		-15.9**	-16.48**
Mother educational level		1.7**	2.26**
Mother educational level Missing		-23.4**	-21.57**

**Table 4** (Continued)

	MODEL A Generation + origins + migration history	MODEL B A + background characteristics	MODEL C B + interactions
Father occupational status		9.0**	9.34**
Father occupational status Missing		-10.8**	-11.18**
Mother occupational status		8.4**	9.53**
Mother occupational status Missing		-16.5**	-16.29**
Male		12.9**	7.12**
R <sup>2</sup>	.125	.305	.316

Source: PISA (2003)

*Notes*\* $p < .05$ ; \*\* $p < .01$ .<sup>1</sup> Coefficients of destination effects (dummies; Australia as reference category) are not presented.

or not. We also control for the influence of gender. All of these variables have a significant effect on one's mathematical ability. For instance, the higher the level of education of a respondent's parents and the higher the occupational status of his/her parents, the higher his/her performance on the mathematical scale. In addition, these variables seem to explain a significant part of the origin effects altogether: with some exceptions, the origin effects decrease dramatically. However, most origin effects remain significant, which indicates that even when background characteristics are taken into account the origin of one's family has an effect on one's mathematical performance.

In model C, significant interactions between destination effects, generation effects, origin effects and relevant background characteristics are added to model B. In order to make sure that model C was as economical as possible, we used a strict procedure (described in Appendix III, available as above) to help us determine which effects should be admitted to the equation, and which should not. We did not restrict ourselves to the interactions with migrant characteristics, but set out to find all significant interactions, our argument being that the non-inclusion of, for instance, Belgium\*Father educational level could lead another interaction, say migrant-characteristic\*Father educational level, to become significant due purely to this non-inclusion. Therefore, we gave priority to methodological security over and above



**Table 5.** OLS regression of respondents' mathematical performance on significant interaction effects, controlled for effects of variables admitted to Model B effects (unstandardized effects)

MODEL C (continued)		MODEL C (continued)	
<i>Interactions with migrant generation status dummies</i>		<i>Interactions with country of destination dummies (cont.)</i>	
South-Eastern Asia*1st generation	-21.89*	Denmark*Mother occupational status	-3.86**
Mother occupational status*2nd generation	-5.32**	Denmark *Male	9.60**
Denmark*2nd generation	-23.85*	Germany*Foreign language spoken at home	-27.21**
Ireland*2nd generation	-37.05**	Germany*Nuclear family	-6.21*
Interactions with region of origin dummies		Germany*Father educational level	2.11*
Western Europe* Father occupational status	9.55**	Germany*Male	9.65**
Western Europe* Foreign language spoken at home	50.47**	Greece*Nuclear family	14.30**
Western Europe* One parent from test country	15.84**	Greece*Family cultural possessions	11.17**
Southern Europe* Father educational level	-4.04**	Greece*Home educational resources	6.07**
Australia* Foreign language spoken at home	-64.37**	Greece*Index of home possessions	-7.49**
Oceania* Mother occupational status	-9.21	Greece*Father educational level	-3.42**
Western Asia* Cultural possessions family	-13.77**	Greece*Mother educational level	2.82**
Eastern Asia* Foreign language spoken at home	36.34**	Greece*Father occupational status	-3.56**
Southern Asia* One parent from test-country	-96.72**	Greece* Mother occupational status	-4.28**
South-Eastern Asia* Mother educational level	-7.83**	Greece*Male	9.11**
South-Eastern Asia* Father occupational status	11.51**	Ireland*Home educational resources	-3.72**
South-Eastern Asia* One parent from test country	-44.28*	Ireland*Mother occupational status	-2.87*
Northern Europe* Scotland	21.32**	Ireland*Male	9.38**
Western Europe* Belgium	-30.68**	Latvia*Nuclear family	-11.58**
Southern Europe* Switzerland	-16.66**	Latvia*Family cultural possessions	7.35**

Table 5 (Continued)

MODEL C (continued)		MODEL C (continued)	
Southern Africa* Belgium	-53.94**	Latvia*Father educational level	-5.41**
Southern Asia* Denmark	-46.18**	Liechtenstein*Father occupational status	8.73*
<i>Interactions with country of destination dummies</i>		Liechtenstein*Male	19.22*
Austria*Family cultural possessions	6.27**	Luxembourg*Home educational resources	-4.85**
Austria*Father educational level	-2.97**	Luxembourg*Male	14.08**
Austria*Mother educational level	-2.58*	New Zealand*Just one parent from test country	9.78**
Austria*Male	9.10**	New Zealand*Nuclear family	7.17**
Belgium*Just one parent from test country	-12.11**	New Zealand*Father educational level	2.32*
Belgium*Foreign language spoken at home	-34.57**	New Zealand*Mother occupational status	-3.28*
Belgium*Nuclear family	13.65**	Switzerland*Just one parent from test country	-11.97**
Belgium* Family cultural possessions	-4.03*	Switzerland*Foreign language spoken at home	-12.19**
Belgium*Home educational resources	3.31*	Switzerland*Nuclear family	6.68**
Belgium*Index of home possessions	10.50**	Switzerland*Family cultural possessions	-6.73**
Belgium*Father educational level	-2.48**	Switzerland *Home educational resources	-4.05**
Belgium*Mother educational level	-3.12**	Switzerland *Index of home possessions	8.02**
Belgium*Mother occupational status	1.64	Switzerland*Father occupational status	-2.70**
Belgium*Male	5.04*	Switzerland*Mother educational level	-1.95**
Denmark*Family cultural possessions	15.22**	Switzerland*Male	11.72**
Denmark*Index of home possessions	-12.92**	Scotland*Nuclear family	-11.04**
Denmark*Father occupational status	-3.18**	Scotland*Mother occupational status	-4.78**

Source: PISA (2003)

Note

\*p &lt; .05; \*\*p &lt; .01.

a theoretical foundation for all given significant interactions. Consequently, the number of significant interaction effects in model C proved to be considerably large; for that reason we were forced to present the model in two different tables. The main effects from model

C are presented in Table 4, and the interaction effects are presented in Table 5.

To exemplify how these tables should be read, we will elaborate on some of the shown parameters of the most important variables. We will first consider the effects of migrants' generation status: as can be seen in model C of Table 4, the general main effect from the first-generation dummy does not statistically significantly deviate from nil ( $b = 2.16$ ), which implies that, in general, first-generation migrants and comparable native pupils perform more or less equally with regard to mathematics. However, this is not true for migrants from a number of regions of origin. When looking at the interaction of the first-generation dummy with region of origin Southeast Asia in Table 5, first-generation migrants perform significantly worse ( $b = -21.89$ ) than comparable natives. In order to compute the total effect for South-east Asian first-generation migrants, we add the main effect from Table 4 to the conditioned effect from Table 5 ( $b = -21.89 + 2.16 = -19.73$ ). However, all migrants from Southeast Asia have higher maths scores ( $b = 37.17$ ), and thus first-generation migrants from this region have a slightly higher maths score than comparable natives ( $b = -19.73 + 37.17 = 17.04$ ). Because there is no significant interaction effect 'South-East Asia\*2nd generation', the second-generation migrant has a substantially higher maths score than a comparable native ( $b = 23.21 + 37.17 = 60.38$ ). For migrants from other regions of origin the results of Tables 4 and 5 are less positive. Pupils (first- and second-generation migrants) from Western Europe, Southern and Central America, Northern Africa and Western Asia have substantially lower math scores than comparable natives. With migrants coming from Western Europe as an exception (the high occupational status of their fathers can neutralize the lower maths score), the lower scores of migrants from this region are not compensated for by any conditioned effect.

The same procedure can be followed to compute the effects of migration characteristics. The most salient feature in model C might be the reappearance of the main second-generation effect. As it appears, when controlled for interactions, the effect on one's mathematical performance of being a second-generation migrant is positive ( $b = 23.21$ ). Although in general the model predicts that second-generation migrants perform better at maths than their comparable native counterparts, this is not true to the same extent for all countries of origin or destination. When, for example, looking at Denmark as a country of destination, the effect of the interaction with the dummy for second-generation migrants ( $b = -23.85$ ) suggests that, in this country, second-generation migrants achieve levels of mathematical ability equal to those of comparable native pupils (bringing the combined effect to  $b = 23.21 - 23.85 = -.64$ ). The maths level for

second-generation migrants in Ireland is lower than that of first-generation migrants in the same country of destination ( $b = -37.05 + 23.21 = -13.84$ ), while the migrants from Southern Asia in Denmark have an even lower score (first generation:  $2.16 - 46.18 = -44.02$ ; second generation:  $23.21 - 46.18 = -22.97$ ).

Surprisingly, in model C the main effect of using a foreign language at home is insignificant ( $b = -1.13$ ). This indicates that pupils in general have no advantage or disadvantage from using a non-native tongue at home. However, this is not true for three countries of destination: Belgium ( $b = -34.57$ ), Germany ( $b = -27.21$ ) and Switzerland ( $b = -12.19$ ). This negative effect of the foreign home language mitigates the higher maths score of second-generation migrants in Germany, leading to a substantially lower score for those second-generation migrants who use a foreign home language ( $b = 23.21 - 27.21 = -4.00$ ). Using a foreign language at home gives higher maths scores for migrants coming from Western Europe and Eastern Asia, but lower maths scores for migrants from Australia.

Having one migrant parent and one parent born in the country of destination (mixed parents) gives no lower maths scores. Migrants coming from Western Europe with mixed parents even score substantially higher ( $b = -1.41 + 15.84 = 14.43$ ), but those originating from Southern Asia or Southeast Asia with mixed parents have substantially lower scores. Migrants coming from Southeast Asia with mixed parents lose the full advantage of coming from that region ( $b = 39.46 - 42.87 = -3.38$ ). In Belgium and Switzerland, having mixed parents lowers the maths score, while it increases the maths score in New Zealand.

Finally, a few combinations of origins and destinations have negative effects on mathematical performance: migrants coming from Western Europe or Southern Africa to Belgium, migrants coming from Southern Europe to Switzerland and migrants from Southern Asia coming to Denmark. There is only one positive combination: migrants from Northern Europe to Scotland.

It is important to realize that these results cannot be explained by pointing to the deviating family characteristics of the migrants from certain regions of origin or to countries of destination. In the final models, we control for the usual family characteristics. We note that it does not seem plausible that these results be explained by negative characteristics not measured here, since such negative destination effects would also occur for migrants in countries that have the most selective migration policies (Denmark, Switzerland). A deviant selection of migrants with negative or positive unmeasured characteristics from certain regions of origin (religion, family values) could offer a plausible explanation. However, with the currently available data, we were unable to measure their effects.

## Conclusions and discussion

Our first goal for this paper was to determine whether or not being a first- or second-generation migrant affects one's scholastic achievement. Our findings indicate that first-generation migrant pupils generally do not perform better or worse in mathematics than their counterpart native classmates, if one takes the social and economic backgrounds of migrants and natives into account. Second-generation migrants appear to perform better than comparable natives. However, this is not found to be true for migrants from all regions of origin. Our analysis shows for example that second-generation migrants from Western Europe (but only those from lower educated classes), Southern and Central America, Northern Africa and Western Asia have substantially lower maths scores than comparable natives. Their maths scores might be higher than those of comparable first-generation migrants from the same region of origin, but they still have a substantial backlog that remains when controlling for the social and economic background characteristics relative to other migrants and natives.

This last proviso brings us to our second research question. We conclude that both origin and destination of migration have substantial effects on scholastic achievement, and that these effects influence in important ways differences in scholastic knowledge between native pupils, first-generation migrants and second-generation migrants. Analysing migrants' integration in host societies without properly taking into account these origin effects will indeed lead to flawed results. Depending on the composition of the migrant population in a certain society, results may be too optimistic or too pessimistic. One could be tempted to explain test-country effects by certain policies (selective immigration policies in Australia) or educational systems (early selection in Germany) instead of the various compositions of migrant populations. Western Europe, Southern and Central America, Northern Africa and Western Asia seem to be problematic regions of origin: migrants from these regions perform worse in mathematics than comparable migrants from other regions, regardless of their country of destination. Tubergen (2004) found comparable origin effects, although less strong, in his study of the economic success of first-generation migrants in a large number of societies of destination. It is too early to give even preliminary explanations, but it is clear that our results invite a new but also dangerous field of research.

In addition, destination effects also occur: some countries of destination are better equipped to deal with immigration than others. For example, our analysis shows that migrants in Denmark are doing worse than those in Germany, despite the late educational selection in

the former country and its selective migration policies. In general, we would conclude that relatively new immigrant receiving countries like Denmark and Switzerland are not yet capable of dealing with immigrants, even if they have very strict and selective migration policies. In some of the new immigrant-receiving societies, immigrants reach substantially lower levels of scholastic achievement compared to natives of these states, in comparison to the differences between immigrants and natives in Australia, a classic immigrant-receiving nation. For example, the better mathematical performance of second-generation migrants does not occur in both Belgium and Ireland. In Belgium and Switzerland, children from culturally mixed families are at a disadvantage when trying to integrate; this effect occurs only in these nations. In addition, the use of a foreign tongue at home constitutes a disadvantage in these two countries, as well as in Germany. The combination of origin and destination effects also renders interesting results. In Belgium, immigrants from Western Europe and Southern Africa experience a greater disadvantage in their efforts to integrate. The same is true for immigrants from South-Asia in Denmark, and from Southern Europe in Switzerland. We could argue that these new migration societies (Belgium, Denmark, Switzerland) have strong insider/outsider distinctions, possibly strengthened by their social security system and their labour-market regulation, and that this insider/outsider distinction is not yet blurred by a tradition of migration, former colonies or lost territories and a volatile history. Societies like Australia, New Zealand and Scotland have longer migration traditions. Austria (including Liechtenstein), Germany, Greece and Latvia have volatile histories, producing partly involuntary migration during the twentieth century, but also less clear outsider/insider distinctions within these societies.

However, these conclusions can only be preliminary, and need further testing. We already mentioned that our data set was far from perfect. Information on countries of birth was not sufficiently specified in some important immigration receiving countries. Future research should use more elaborate data. We would argue that our results should encourage the adaptation of more detailed questions on origin in cross-national data sets, such as PISA. Another improvement could be made by specifying how differences between countries of destination and origin groups come about. This could be done by replacing country of origin and country of destination indicators by macro-variables (like political stability, economic poverty or religious composition) to test the significance of the assumed processes which are supposed to produce these origin and destination effects. Finally, there is a clear need to rethink and conceptualize the available theories in order to understand and to measure these origin and destination effects better. Our article shows only the potential strength of these

effects and thus the importance of further theorizing and testing of these phenomena.

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